# Prevention of Cardiovascular Disease 2024 Update

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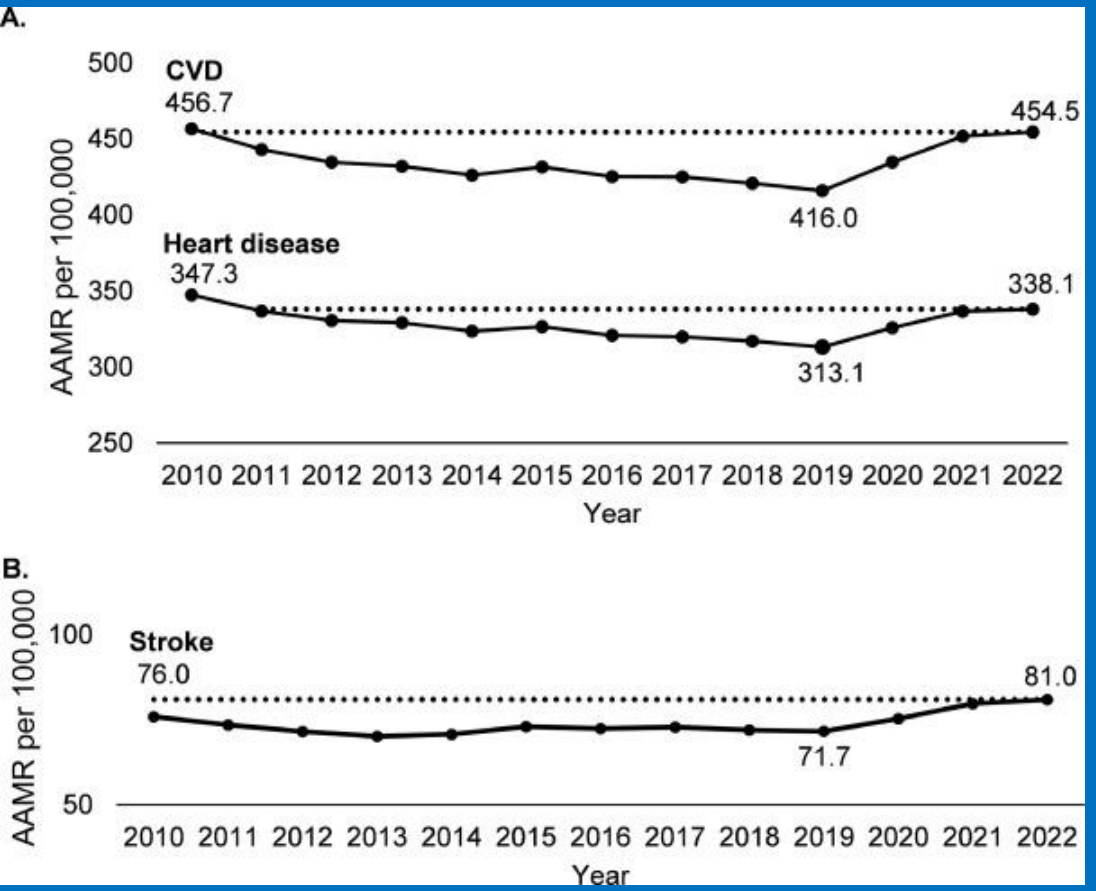
# IMPACT OF CARDIOVASCULAR DISEASE

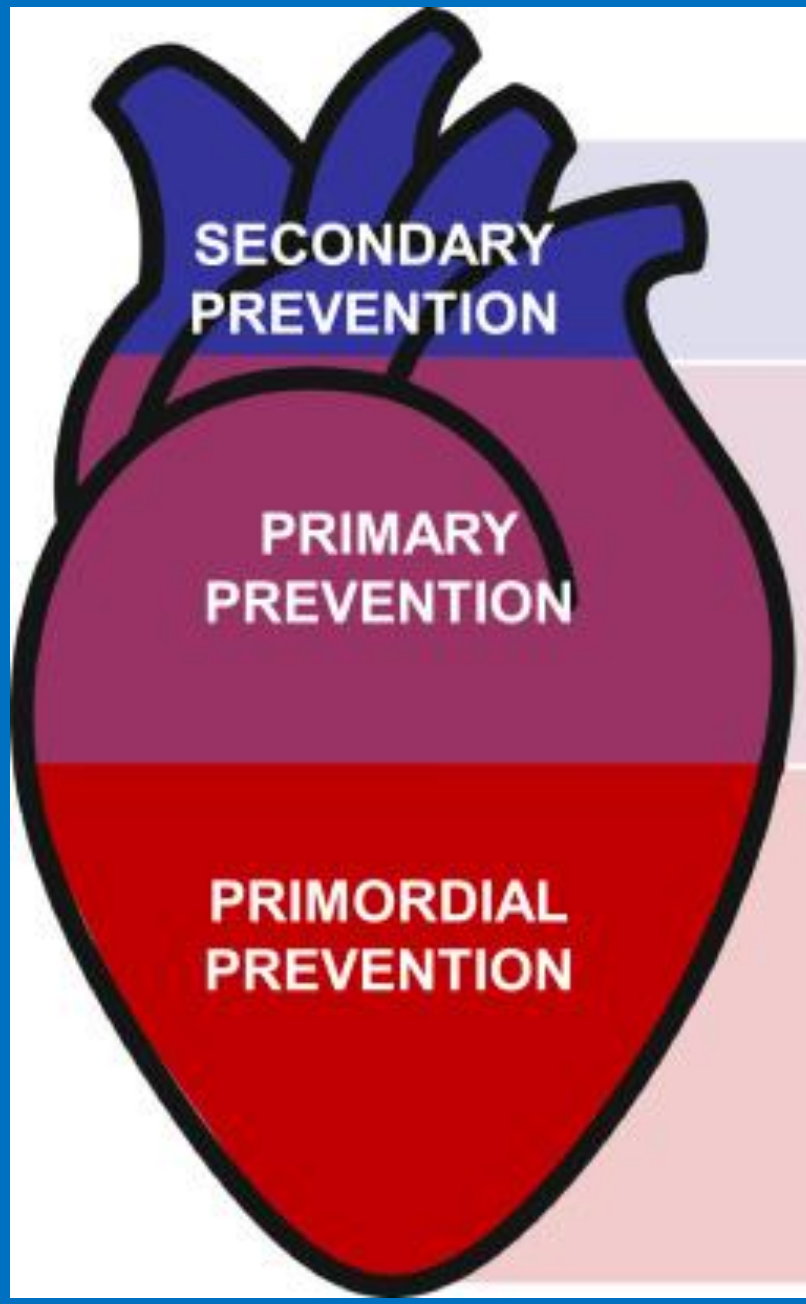
- Even though there have been improvements in atherosclerotic cardiovascular disease (ASCVD) outcomes, it is still the leading cause of morbidity and mortality globally.
- Leading cause of death in the US, cost >200 billion/y
- Mostly due to uncontrolled RF
- Most Americans that had an MI had atleast one RF

# Impact of the Problem




- Despite stabilization of the public health emergency, declines in CVD mortality rates reversed in 2020 and remained high in 2022, representing almost a decade of lost progress and over 228,000 excess CVD deaths.

- This underscores the importance of prioritizing prevention and management of CVD to improve outcomes.




**Second Event: Recurrent Major Adverse Cardiovascular Event**

**First Event: Clinical Disease**

Myocardial infarction, congestive heart failure, peripheral artery disease, stroke, sudden cardiac death

**Risk Factors:**

Sedentary lifestyle, obesity, sleep, diet, smoking, hypertension, dyslipidemia, chronic kidney disease, metabolic syndrome/diabetes, female-specific factors, psychosocial stressors, inflammation

Circulation

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# 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

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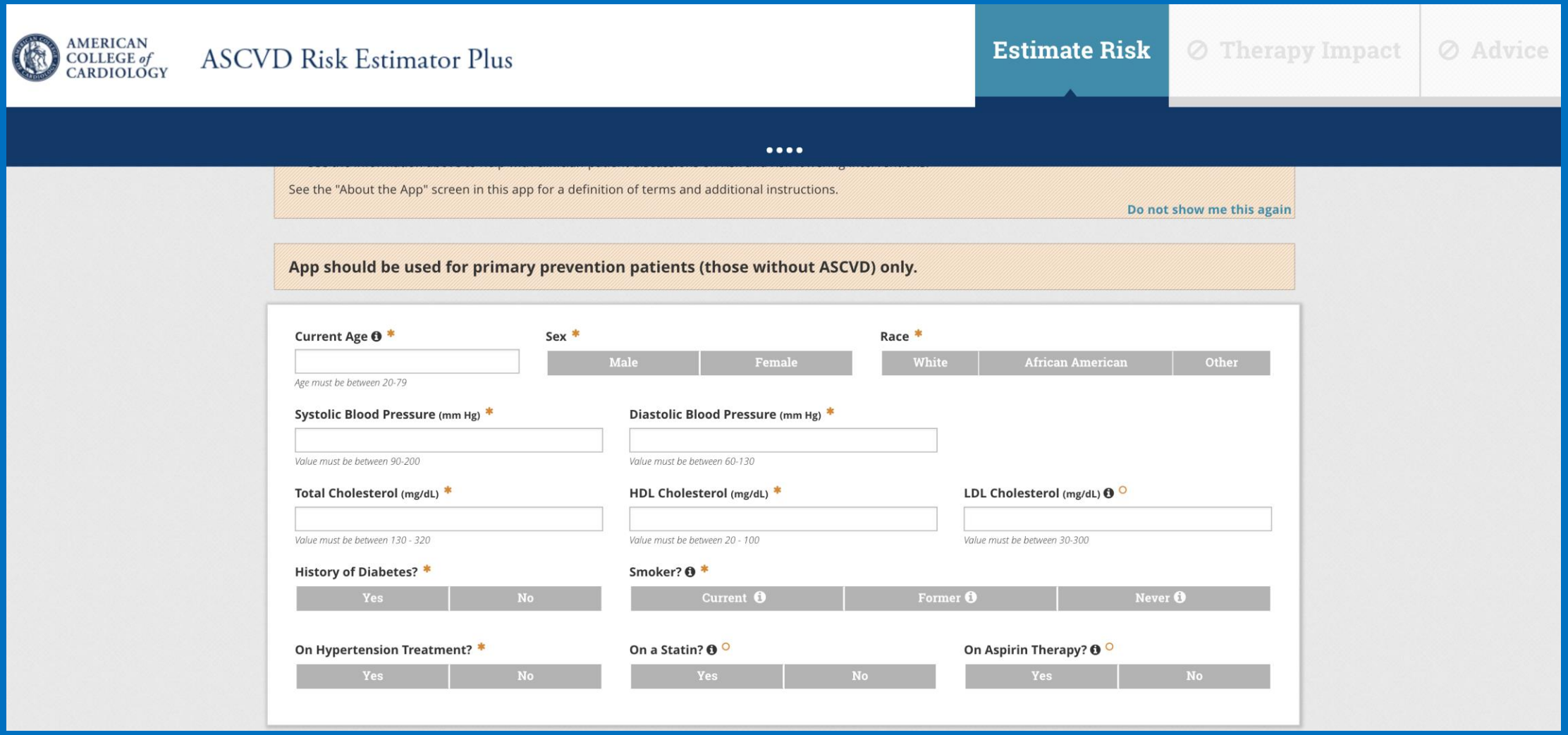
# RISK ASSESSMENT

The best way to prevent coronary artery disease, vascular disease, heart failure and atrial fibrillation is to control risk factors.

# Adults between the age of 40-75 years, should have a screening 10 year ASCVD risk estimation, and informed discussion about diet/ BP meds and lipids.



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**Recommendations for Assessment of Cardiovascular Risk**

**Referenced studies that support recommendations are summarized in Online Data Supplement 3.**

| COR | LOE | Recommendations |
|---|---|---|
| I | B-NR | 1. For adults 40 to 75 years of age, clinicians should routinely assess traditional cardiovascular risk factors and calculate 10-year risk of ASCVD by using the pooled cohort equations (PCE).[S2.2-1,S2.2-2] |
| IIa | B-NR | 2. For adults 20 to 39 years of age, it is reasonable to assess traditional ASCVD risk factors at least every 4 to 6 years.[S2.2-1–S2.2-3] |
| IIa | B-NR | 3. In adults at borderline risk (5% to <7.5% 10-year ASCVD risk) or intermediate risk (≥7.5% to <20% 10-year ASCVD risk), it is reasonable to use additional risk-enhancing factors to guide decisions about preventive interventions (eg, statin therapy).[S2.2-4–S2.2-14] |
| IIa | B-NR | 4. In adults at intermediate risk (≥7.5% to <20% 10-year ASCVD risk) or selected adults at borderline risk (5% to <7.5% 10-year ASCVD risk), if risk-based decisions for preventive interventions (eg, statin therapy) remain uncertain, it is reasonable to measure a coronary artery calcium score to guide clinician–patient risk |
| IIb | B-NR | 5. For adults 20 to 39 years of age and for those 40 to 59 years of age who have <7.5% 10-year ASCVD risk, estimating lifetime or 30-year ASCVD risk may be considered.[S2.2-1,S2.2-2,S2.2-32–S2.2-35] |

| Risk-Enhancing Factors |
| --- |
| Family history of premature ASCVD (males, age <55 y; females, age <65 y) |
| Primary hypercholesterolemia (LDL-C, 160–189 mg/dL [4.1–4.8 mmol/L]; non–HDL-C 190–219 mg/dL [4.9–5.6 mmol/L])* |
| Metabolic syndrome (increased waist circumference [by ethnically appropriate cutpoints], elevated triglycerides [>150 mg/dL, nonfasting], elevated blood pressure, elevated glucose, and low HDL-C [<40 mg/dL in men; <50 mg/dL in women] are factors; a tally of 3 makes the diagnosis) |
| Chronic kidney disease (eGFR 15–59 mL/min/1.73 $m^2$ with or without albuminuria; not treated with dialysis or kidney transplantation) |
| Chronic inflammatory conditions, such as psoriasis, RA, lupus, or HIV/AIDS |
| History of premature menopause (before age 40 y) and history of pregnancy-associated conditions that increase later ASCVD risk, such as preeclampsia |
| High-risk race/ethnicity (eg, South Asian ancestry) |
| Lipids/biomarkers: associated with increased ASCVD risk |
| Persistently elevated* primary hypertriglyceridemia (≥175 mg/dL, nonfasting) |
| If measured: |
| Elevated high-sensitivity C-reactive protein (≥2.0 mg/L) |
| Elevated Lp(a): A relative indication for its measurement is family history of premature ASCVD. An Lp(a) ≥50 mg/dL or ≥125 nmol/L constitutes a risk-enhancing factor, especially at higher levels of Lp(a). |
| Elevated apoB (≥130 mg/dL): A relative indication for its measurement would be triglyceride ≥200 mg/dL. A level ≥130 mg/dL corresponds to an LDL-C >160 mg/dL and constitutes a risk-enhancing factor |
| ABI (<0.9) |

# DIET

**Recommendations for Nutrition and Diet**

**Referenced studies that support recommendations are summarized in Online Data Supplements 4 and 5.**

| COR | LOE | Recommendations |
|---|---|---|
| I | B-R | 1. A diet emphasizing intake of vegetables, fruits, legumes, nuts, whole grains, and fish is recommended to decrease ASCVD risk factors.[S3.1-1–S3.1-11] |
| IIa | B-NR | 2. Replacement of saturated fat with dietary monounsaturated and polyunsaturated fats can be beneficial to reduce ASCVD risk.[S3.1-12,S3.1-13] |
| IIa | B-NR | 3. A diet containing reduced amounts of cholesterol and sodium can be beneficial to decrease ASCVD risk.[S3.1-9,S3.1-14–S3.1-16] |
| IIa | B-NR | 4. As a part of a healthy diet, it is reasonable to minimize the intake of processed meats, refined carbohydrates, and sweetened beverages to reduce ASCVD risk.[S3.1-17–S3.1-23] |
| III-Harm | B-NR | 5. As a part of a healthy diet, the intake of *trans* fats should be avoided to reduce ASCVD risk.[S3.1-12,S3.1-17,S3.1-25–S3.1-27] |

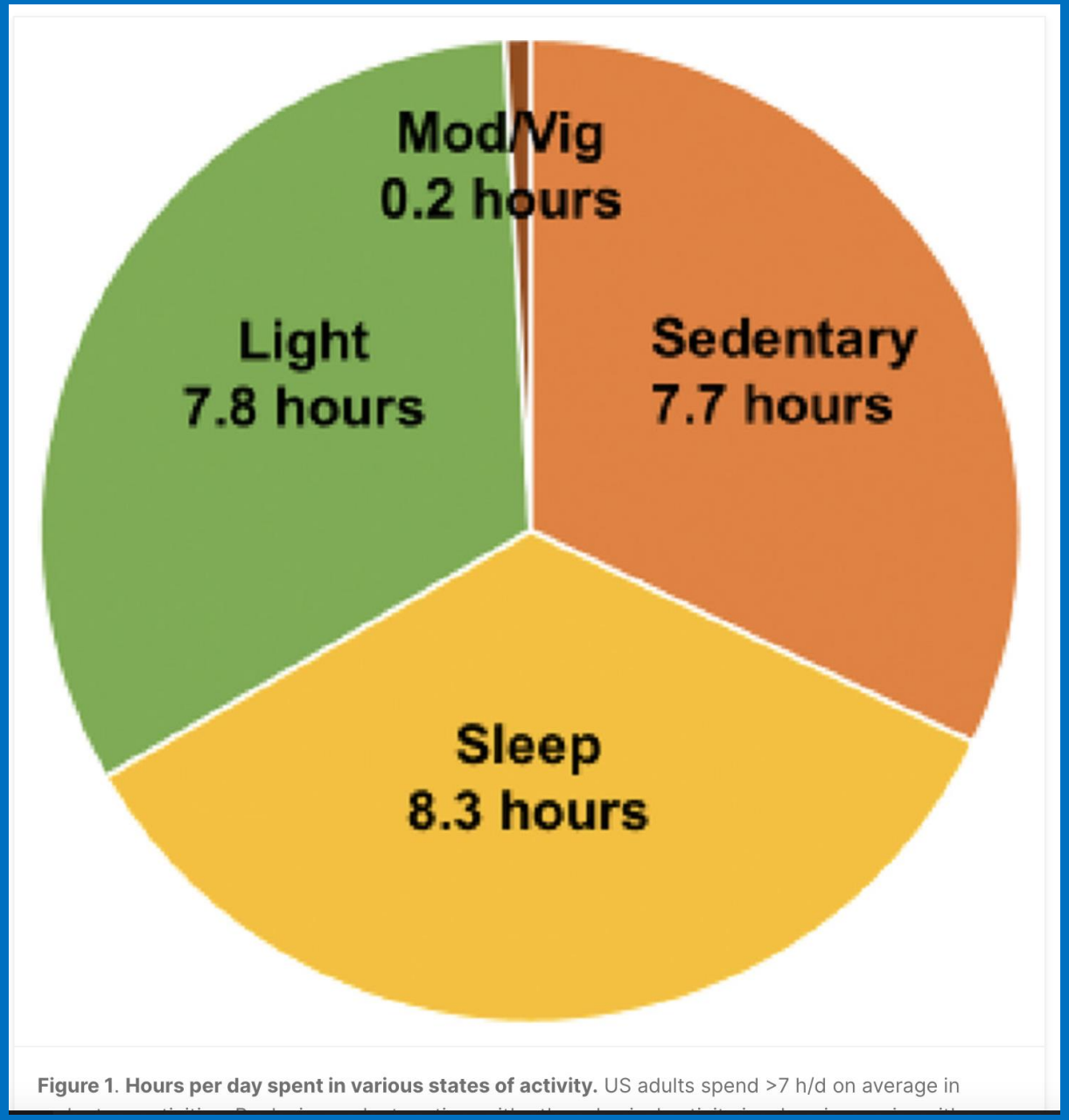


**Figure 1. Hours per day spent in various states of activity.** US adults spend >7 h/d on average in

# Exercise

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**Recommendations for Exercise and Physical Activity**

**Referenced studies that support recommendations are summarized in Online Data Supplements 6 and 7.**

| COR | LOE | Recommendations |
|---|---|---|
| I | B-R | 1. Adults should be routinely counseled in healthcare visits to optimize a physically active lifestyle.[S3.2-1,S3.2-2] |
| I | B-NR | 2. Adults should engage in at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity (or an equivalent combination of moderate and vigorous activity) to reduce ASCVD risk.[S3.2-3–S3.2-8] |
| IIa | B-NR | 3. For adults unable to meet the minimum physical activity recommendations (at least 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity), engaging in some moderate- or vigorous-intensity physical activity, even if less than this recommended amount, can be beneficial to reduce ASCVD risk.[S3.2-5,S3.2-6] |
| IIb | C-LD | 4. Decreasing sedentary behavior in adults may be reasonable to reduce ASCVD risk.[S3.2-3,S3.2-9–S3.2-11] |

**Table 4**. Definitions and Examples of Different Intensities of Physical Activity

| Intensity | METs | Examples |
|---|---|---|
| Sedentary behavior* | 1–1.5 | Sitting, reclining, or lying; watching television |
| Light | 1.6–2.9 | Walking slowly, cooking, light housework |
| Moderate | 3.0–5.9 | Brisk walking (2.4–4 mph), biking (5–9 mph), ballroom dancing, active yoga, recreational swimming |
| Vigorous | ≥6 | Jogging/running, biking (≥10 mph), singles tennis, swimming laps |

* *Sedentary behavior* is defined as any waking behavior characterized by an energy expenditure ≤1.5 METs while in a sitting, reclining, or lying posture. Standing is a sedentary activity in that it involves ≤1.5 METs, but it is not considered a component of sedentary behavior.

MET indicates metabolic equivalent; and mph, miles per hour.


AM600289
CNN
"NOW FOR YOUR STRESS TEST."

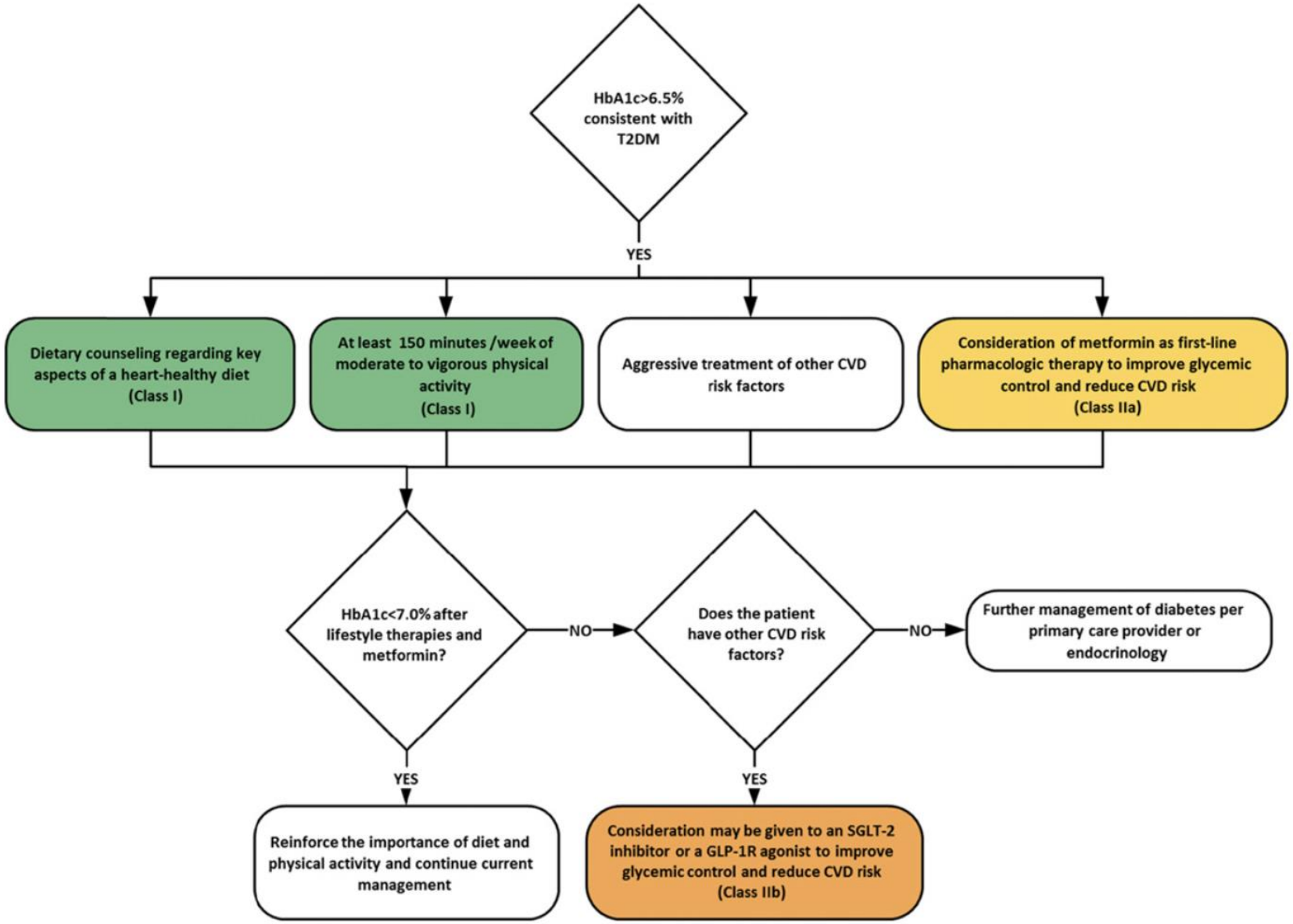
# Obesity

**Recommendations for Adults With Overweight and Obesity**

**Referenced studies that support recommendations are summarized in Online Data Supplements 8 and 9.**

| COR | LOE | Recommendations |
|---|---|---|
| I | B-R | 1. In individuals with overweight and obesity, weight loss is recommended to improve the ASCVD risk factor profile.[0650] |
| I | B-R | 2. Counseling and comprehensive lifestyle interventions, including calorie restriction, are recommended for achieving and maintaining weight loss in adults with overweight and obesity.[S4.1-1,S4.1-2] |
| I | C-EO | 3. Calculating body mass index (BMI) is recommended annually or more frequently to identify adults with overweight and obesity for weight loss considerations. |
| IIa | B-NR | 4. It is reasonable to measure waist circumference to identify those at higher cardiometabolic risk.[S4.1-3–S4.1-6] |

# DIABETES

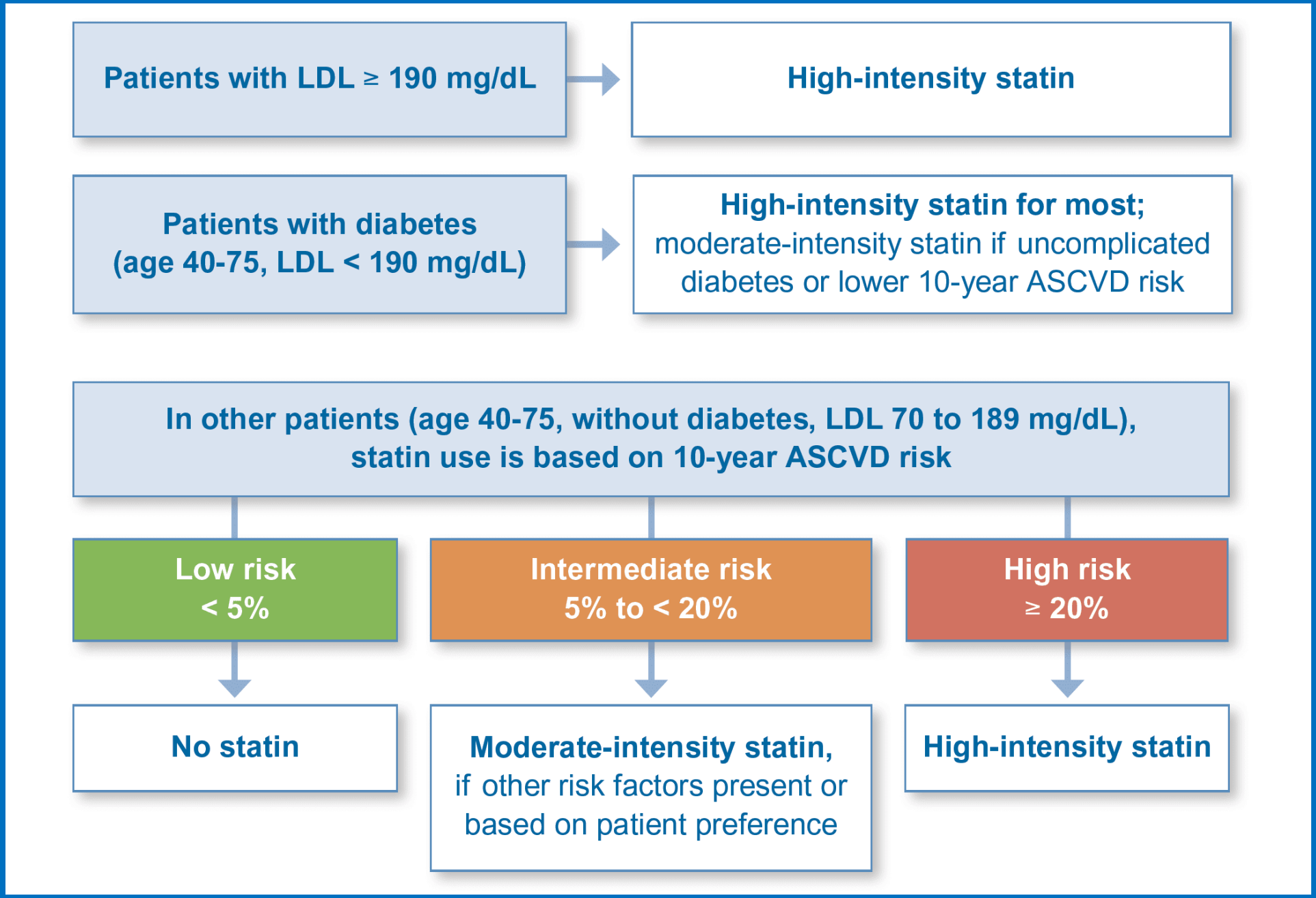

HbA1c>6.5% consistent with T2DM
YES
Dietary counseling regarding key aspects of a heart-healthy diet (Class I)
At least 150 minutes /week of moderate to vigorous physical activity (Class I)
Aggressive treatment of other CVD risk factors
Consideration of metformin as first-line pharmacologic therapy to improve glycemic control and reduce CVD risk (Class IIa)
HbA1c<7.0% after lifestyle therapies and metformin?
NO
Does the patient have other CVD risk factors?
NO
Further management of diabetes per primary care provider or endocrinology
YES
YES
Reinforce the importance of diet and physical activity and continue current management
Consideration may be given to an SGLT-2 inhibitor or a GLP-1R agonist to improve glycemic control and reduce CVD risk (Class IIb)

# Statins

## Table 1. USPSTF Recommendations for Primary Prevention of CVD in Patients with One or More Risk Factors[1]

| Age | 10-year Risk[2] | Recommendation |
|---|---|---|
| 40-75 years | ≥10% | Initiate low- to moderate-intensity statin therapy[3] |
| | 7.5-10% | Selectively offer low- to moderate-intensity statin therapy[3,4] |
| ≥75 years | Any | Evidence insufficient to recommend initiating statin therapy |

1. Dyslipidemia, diabetes, hypertension, or smoking.
2. Calculated using the ACC/AHA Pooled Cohort Equation (tools.acc.org/ASCVD-Risk-Estimator).
3. Low-intensity statin therapy lowers LDL-cholesterol <30%; moderate-intensity statin therapy lowers it 30-<50%.
4. Based on professional judgment and patient preference.

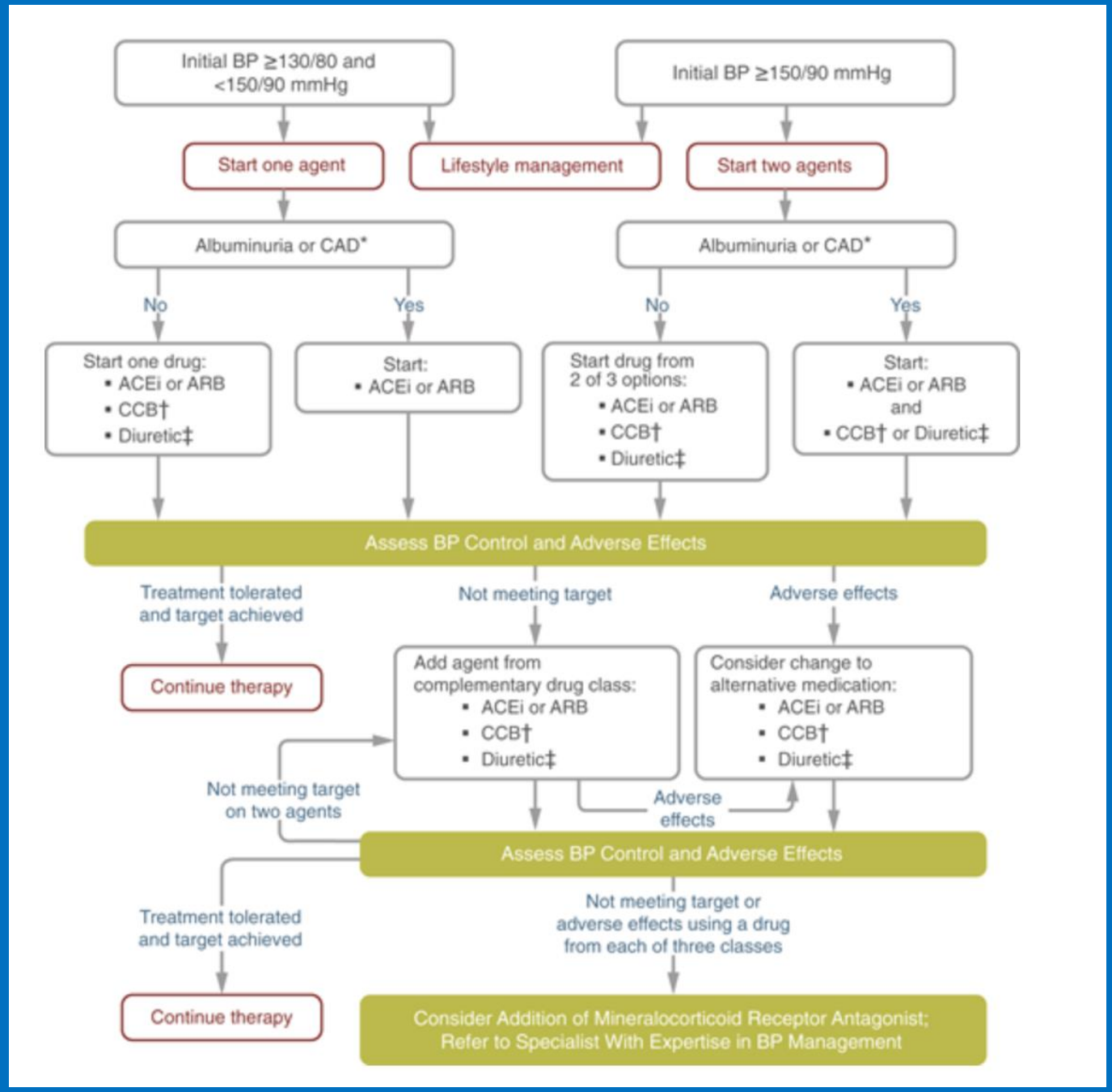

Patients with LDL ≥ 190 mg/dL
High-intensity statin
Patients with diabetes (age 40-75, LDL < 190 mg/dL)
High-intensity statin for most; moderate-intensity statin if uncomplicated diabetes or lower 10-year ASCVD risk
In other patients (age 40-75, without diabetes, LDL 70 to 189 mg/dL), statin use is based on 10-year ASCVD risk
Low risk < 5%
Intermediate risk 5% to < 20%
High risk ≥ 20%
No statin
Moderate-intensity statin, if other risk factors present or based on patient preference
High-intensity statin

# Types of Statins

| High-Intensity Statin Therapy | Moderate-Intensity Statin Therapy | Low-Intensity Statin Therapy |
|---|---|---|
| Daily dose lowers LDL on average by ≥50% | Daily dose lowers LDL on average by approximately 30-49% | Daily dose lowers LDL on average by <30% |
| Atorvastatin 40-80 mg<br>Rosuvastatin 20-40 mg | Atorvastatin 10-20 mg<br>Rosuvastatin 5-10 mg<br>Simvastatin 20-40 mg<br>Pravastatin 40-80 mg<br>Lovastatin 40 mg<br>Fluvastatin XL 80 mg<br>Fluvastatin 40 mg BID<br>Pitavastatin 2-4 mg | Simvastatin 10 mg<br>Pravastatin 10-20 mg<br>Lovastatin 20 mg<br>Fluvastatin 20-40 mg |

# Hypertension

- An elevated blood pressure is defined as a systolic blood pressure 120–129 mmHg and a diastolic blood pressure <80 mmHg.
- Hypertension is defined as a systolic blood pressure ≥130 mmHg or a diastolic blood pressure ≥80 mmHg.
- Hypertension is common among people with either type 1 or type 2 diabetes.
- Hypertension is a major risk factor for ASCVD, heart failure, and microvascular complications.
- Studies have shown that antihypertensive therapy reduces ASCVD events, heart failure, and microvascular complications.


Initial BP ≥130/80 and <150/90 mmHg
Initial BP ≥150/90 mmHg
Start one agent
Lifestyle management
Start two agents
Albuminuria or CAD*
Albuminuria or CAD*
No
Yes
No
Yes
Start one drug:
• ACEi or ARB
• CCB†
• Diuretic‡
Start:
• ACEi or ARB
Start drug from 2 of 3 options:
• ACEi or ARB
• CCB†
• Diuretic‡
Start:
• ACEi or ARB
and
• CCB† or Diuretic‡
Assess BP Control and Adverse Effects
Treatment tolerated and target achieved
Not meeting target
Adverse effects
Continue therapy
Add agent from complementary drug class:
• ACEi or ARB
• CCB†
• Diuretic‡
Consider change to alternative medication:
• ACEi or ARB
• CCB†
• Diuretic‡
Not meeting target on two agents
Adverse effects
Assess BP Control and Adverse Effects
Treatment tolerated and target achieved
Not meeting target or adverse effects using a drug from each of three classes
Continue therapy
Consider Addition of Mineralocorticoid Receptor Antagonist; Refer to Specialist With Expertise in BP Management

# Pharmacologic Interventions

- Individuals with confirmed office-based blood pressure ≥130/80 mmHg
- Individuals with confirmed office-based blood pressure ≥150/90 mmHg:two drugs
- ACE inhibitors or angiotensin receptor blockers (ARBs) are recommended first-line therapy for hypertension in people with diabetes and coronary artery disease. **A**

Multiple-drug therapy, combinations of ACE inhibitors and ARBs and combinations of ACE inhibitors or ARBs (including ARBs/neprilysin inhibitors) with direct renin inhibitors should not be used.

- An ACE inhibitor or ARB, at the maximum tolerated dose indicated for blood pressure treatment, is the recommended first-line treatment for hypertension in people with diabetes and urinary albumin-to-creatinine ratio ≥300 mg/g creatinine **A** or 30–299 mg/g creatinine.

- For adults treated with an ACE inhibitor, ARB, mineralocorticoid receptor antagonist (MRA), or diuretic, serum creatinine/estimated glomerular filtration rate and serum potassium levels should be monitored within 7–14 days after initiation of therapy and at least annually. **B**

## Primary Prevention: Lifestyle Changes and Team-Based Care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# Risk Factors

- Nonmodifiable: age, sex, race, FH of CAD
- Behavioral RF: smoking, sedentary lifestyle, unhealthy diet, alcohol
- Physiological RF: HTN, Obesity, lipids, diabetes

# Secondary Prevention

# Secondary prevention

- CVD events in those with preexisting disease are 5-7 times greater
- Diabetes is similar risk as previous HA
- Risk factor modification
- Categories:
  - Stable CAD
  - Unstable CAD
  - Prior MI
  - Prior CABG
  - Prior PTCA

- Risk predictors for 2 years
- BP, Cholesterol, diabetes are predictors of reinfarction, MI
- Females have a poorer prognosis
- Definite benefit: Cholesterol meds, Aspirin, , smoking cessation, diet and exercise
- Probable benefit: Diabetes, low HDL,, Triglycerides
- Doubtful: Hormone replacement, antioxidants.

- Eat healthy
- Stay active
- Get enough sleep
- Don’t smoke
- Maintain healthy weight
- Control cholesterol
- Manage blood sugar
- Keep blood pressure in healthy range

# Thank you